ATTACHMENT - REMARKS

By this Amendment, the preamble of independent method claim 1 has been amended to better comply with US practice. In addition, independent apparatus claim 27 has been amended for better defining the invention consistent with a similar limitation in claim 1. Dependent claim 42 has been amended to better define the invention. Finally, a new independent method claim 44 and independent claims apparatus claim 45 are added to further claim the present invention. It is submitted that the present application is in condition for allowance for the following reasons.

Claim Rejections—35 USC § 102

In the outstanding Office Action, the Examiner rejects independent method claim 1 and claims 2, 4, 8-9, 12-17, and 22-26 dependent therefrom, as well independent apparatus claim 27 and claims 28, 30, 33, 34, 37-39, and 42 dependent therefrom under 35 U.S.C. 102 (b) as being anticipated by Hailey (US 6,349,038).

Hailey, as the title of the cited document implies, is concerned with the electromagnetic compatibility of printed circuit boards. In particular, Hailey aims to reduce electromagnetic emissions arising from split conductor planes, by increasing the capacitance between those planes such as by increasing the length of the boundary between the planes by using patterns such as interdigitated fingers (cf. Figure 5A) or arrow patterns (cf. Figure 8). Hailey thus dwells extensively on the electrical and electromagnetic characteristics of these structures, both of the prior art and of the disclosed invention. These structures are, therefore, the focus of Hailey's disclosure.

The present invention, on the other hand, concerns a particular novel method of manufacturing an electrical component and to electrical components manufactured by that method. As is discussed below, Hailey makes no disclosure of the claimed manufacturing method or of components manufactured by that method, or indeed of components with features comparable to those manufactured by the claimed method. Consequently, Hailey is not relevant to the novelty or obviousness of the presently claimed invention.

Firstly, therefore, Hailey fails to disclose the method of manufacturing defined in claim 1 and claims depending therefrom. That method includes bonding a thin metal foil to an insulating substrate. Hailey makes no reference to metal foils, thin or otherwise, and certainly no reference to bonding a thin metal foil to an insulating substrate as claimed.

The Examiner identifies "first metallic conducting part 302" as meeting the limitations of the "thin metal foil" of the present application, but Hailey discloses nothing about metallic conducting part 302 that would suggest that it could validly be described as a "thin metal foil" as the term would be understood by those of ordinary skill in the art. Indeed, if anything, Hailey teaches against metallic conducting part 302 being a "thin metal foil": as depicted in Figures 3 and 4A, metallic conducting part 302 appears of substantial thickness.

In addition, Hailey nowhere refers to the bonding of metallic conducting part 302 to a substrate – whether insulating or otherwise – and at no point discloses the formation of a component blank having a metal face that comprises a surface of a metal foil, as claimed, whether comprising metallic conducting part 302 or otherwise.

The Examiner identifies multilayer printed circuit board structure 300 of Figure 3 as disclosing the presenting claimed insulating substrate, but printed circuit board structure 300 includes post metallic conducting part 302 and second metallic conducting part 304 [column 2, lines 59 to 63], so it cannot correctly be described as "insulating" as would be understood by those of ordinary skill. Indeed, first and second metallic parts 302, 304 are said to constitute "conducting plane 316" [column 2, lines 63]. Clearly, therefore, multilayer printed circuit board structure 300 does not meet any reasonable definition of an "insulating substrate."

Secondly, Hailey makes no reference to laser machining, whether of at least the metal foil or otherwise. Indeed, Hailey makes no reference to machining of any kind. In particular, according to the present invention, laser machining is used to produce at least one trench for defining one or more foil tracks; this is done to prevent current flow across the trench. In particular, the trench is at least equal in depth to the thickness of the foil to prevent current flow across the trench. Hailey is concerned exclusively with printed circuit boards, not with electrical components in which foil tracks are formed by laser machining.

The Examiner identifies moat 306 of Figures 3 and 4A as anticipating the claimed trench, but there is no disclosure of a method of producing moat 306 by laser machining as claimed. Also, trench 306 is not provided for defining one or more foil tracks. Moat 306 separates first metallic conducting part 304, which are not – considered alone or in combination – foil tracks. Indeed, Hailey describes first and second metallic conducting parts 302, 304 as able to be characterized (if not actually) a sort of "parallel plate" capacitor [column 3, line 8].

Thirdly, whether or not one regards moat 306 as meeting the definition of the claimed trench, there is no disclosure in Hailey of filling moat 306 with a trench filling material without overlaying said metal face with said trench filling material. The present inventor has discovered that superior results can be achieved if, when manufacturing the electrical component, one avoids overlaying the metal face with trench filling material (rather than, for example, over-filling the trench and hence having to remove the excess filling material from the metal face). Moat 306 (and the other illustrated moats 500, 600, 700, etc.) are described as "dielectric filled", but Hailey makes no reference to the manner in which these moats should be filled with dielectric material, and certainly omits any suggestion that such moats should be filled without overlaying [a] metal face with said trench filling material as specifically claimed.

It is submitted, therefore, that Hailey is entirely silent on all of the steps of the method defined in claims 1 to 24, and consequently these claims are all clearly novel over the disclosure of Hailey and are further not made obvious by the disclosure of Hailey. Therefore, independent claim 1 and the claims dependent therefrom are all allowable.

Similarly, dependent claims 25 and 26 – which incorporate the method of claim 1 – are likewise novel and nonobvious over Hailey.

Concerning dependent claims 2 and 28, the Examiner contends that Hailey further discloses performing laser machining and thereby creating foil tracks with the spacing approximately equal to the cutting width of the laser. As explained above, Hailey makes no reference whatsoever to laser machining, let alone to the use of a

laser with a cutting width approximately equal to the spacing of foil tracks created thereby as claimed.

Concerning dependent claim 7, the Examiner contends that Hailey discloses an electrical component that is a sensor. However, Hailey includes no disclosure whatsoever of a sensor. Indeed, Hailey's application is limited to printed circuit boards; which are used for carrying electrical or electronic components (perhaps of the type manufactured according to the present invention) as part of a circuit. Consequently, one would not expect Hailey to refer to sensors and, indeed, Hailey does not.

Regarding dependent claim 8, the Examiner contends that Hailey further discloses an electrical component that is a foil sensor but, again, Hailey makes no reference to sensors of any kind; in particular, Figure 4A merely depicts split conducting plane 316 of multilayer printed circuit board structure 300. There is no suggestion that multilayer printed circuit board structure 300 is or could constitute a foil sensor. In addition, claim 8 defines forming the metal foil from a parent foil that is substantially identical with the material of the structure to be monitored. Hailey makes no reference to monitoring a structure, let alone creating a foil sensor with a metal foil of identical material.

Regarding dependent claim 9, the Examiner contends that Hailey discloses laser machining a component blank to produce one or more back slots equal in depth to the full thickness of the component blank. Firstly, as discussed above extensively, Hailey makes no reference to laser machining of any kind. In addition, the claimed "component blank" is defined (see claim 1) as the result of bonding a thin metal foil to an insulating substrate. The component blank has thus a metal face and a back

comprising the insulating substrate. Claim 9 concerns the formation of back slots in this insulating substrate but Hailey makes no reference to forming – by any technique – slots of any kind in such an insulated substrate.

Regarding dependent claims 12 and 13, the Examiner suggests that Hailey discloses machining a sample of parent material to a desired final thickness. However, the conducting parts 302, 304 (to which the Examiner apparently refers) are not described as manufactured by any particular process. There are many such techniques known in the art (including chemical milling and rolling). The present inventor has found that, advantageously, machining has the dual benefits of removing any surface finish arising from the manufacturing of the parent material, and thinning the parent material without affecting the properties of the material (see page 3, lines 1 to 5 of the present application as filed). Hailey discloses neither this process nor these benefits.

Regarding dependent claim 14, the Examiner contends that Hailey further discloses preparing a metal foil (in the form of conducting part 302) for bonding by applying a chemically resistant film to a first face and applying a bond enhancer to the other face of the foil. Hailey makes no reference to bonding processes generally, or to the use of a bond enhancer of any kind, or to the use of a chemically resistant film.

Similarly, with respect to dependent claim 15, Hailey makes no reference to drying a thin metal foil, or to a process that might imply the need for subsequent drying of such a foil.

Regarding dependent claim 16, the Examiner contends that Hailey discloses the use (in the embodiment defined in claim 14) of a chemically resistant film that comprises a polyester tape. Hailey makes no reference whatsoever to the use of a chemically

resistant film, or indeed to a film of any kind. The Examiner directs the applicant's attention to paragraph 368 of Hirose (US 2004/0025333)[1]. This passage refers to the use of an adhesive agent for electroless plating, the basic material of which is thermosetting resin in the form or any one of "epoxy resin, phenol resin and polyimide resin." None of these materials (or the others identified in paragraph 368 of Hirose) constitutes a polyester tape.

Regarding dependent claim 17, the Examiner contends that Hailey further discloses choosing an insulating material to have an ablation rate "that is sufficiently low to prevent unwanted penetration of the substrate during machining to remove said foil." However, Hailey makes no reference to an insulating material, let alone to machining such an insulating material or to choosing an insulating material according to its ablation rate.

Regarding dependent claims 22 and 34, the Examiner contends that Hailey further discloses an electrical component selected from the group of "a linear polarisation resistance gauge; a corrosion sensor; a resistance sensor; a non-destructive testing sensor; a spiral inductor; a delay line; a capacitor; and a sensor responsive to changes in a dielectric material. The applicant is directed by the examiner to column 5, lines 26 to 32 of Hailey. The relevance of this passage presumably resides in its reference to a "parallel plate capacitor" [column 5, lines 28 and 29]. However, Hailey does not disclose or suggest a capacitor, but rather that "one grossly-simplified way" [column 5, lines 28 and 29] to describe the behavior of the current in the device of figure 4A is to model that device as a parallel plate capacitor. In

[1] Seemingly evidencing that this anticipation rejection is improper, and instead claim 16 should be rejected as obvious under § 103 over a combination of the noted references.

any event, Hailey fails to disclose a method of manufacturing an electrical component comprising a capacitor according to the method of dependent claim 22 or with the corresponding characteristics of the apparatus of dependent claim 34.

Regarding dependent claims 23 and 37, the Examiner identifies Figures 3 and 4A of Hailey as disclosing a trench with a ratio of depth to width of from 1:1 to 7:1. These claimed ratios, it should be understood, imply a trench ranging from one of an essentially square cross-section (i.e., a depth to width of 1:1) to one which is very deep (i.e. a depth to width of 7:1); notably, over the defined range of ratio, depth ≥ width. Moat 306 of Figures 3 and 4A, to which the Examiner presumably alludes, is depicted with depth < width, and in fact with depths significantly less than width. In Figure 3, the illustrated ratio of depth to width appears to be approximately 1:3, while in Figure 4A this ratio appears to be approximately 1:2. Neither ratio falls within the range claimed in claims 23 and 37.

Regarding independent claim 27 and dependent claim 42, the Examiner raises much the same objection as that against claim 1. However, claims 27 and 42 define an electrical component that is recited as manufactured, in effect, according to the methods of claims 1 and 9. In addition, claims 27 and 42 have been amended to further clarify that this is so. Thus, the laser machined trench of claim 27 is now defined as "filled with a trench filling material applied without overlaying said metal face", and the back slots of claim 42 are now defined as "formed by laser machining said component blank." Thus, it is submitted that independent claim 27 and dependent claim 42 (and indeed all of the other claims dependent on claim 27) are novel and unobvious over the disclosure of Hailey.

Regarding dependent claim 39, the Examiner is referred to the remarks above concerning dependent claim 17 above.

In addition, it has become apparent to the applicant – including in view of the art identified by the present Examiner – that the aspects of the invention described at page 2, lines 2 to 11 and page 4, lines 9 to 17 of the application as filed (as International Application No. PCT/AU2004/001686) are novel and inventive. New independent claims 44 and 45 have thus been appended herewith directed to these aspects of the invention, with minor modifications for consistency with amended claims 1 and 27. The Examiner is referred to the pertinent discussion above of the features defined in new independent claims 44 and 45 and which, it is submitted, are likewise novel and inventive over the presently cited art.

Claims Rejections—USC § 103

The Examiner rejects claims dependent 3, 10, 11, 29 and 43 under 35 U.S.C. 103(a) as being unpatentable over Hailey.

Regarding dependent claims 3 and 29, the Examiner contends that Hailey discloses all of the claimed limitations "except the minimum cutting width is from 25 μm and the maximum value is 30 μm." The Examiner indicates the split conducting plane 316 of Hailey and suggests that, because it has a uniform width, "it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the minimum value of the cutting width to 25 μm and the maximum value of the cutting width to 30 μm, since it has been held that discovering an optimum value are a result of effective variable and involves only routine skill in the art."

However, there is no suggestion in Hailey that this "split" (comprising moat 306) is created by cutting a parent material into two pieces 302, 304. The precise width of moat 306 may simply be created (though Hailey is silent on this question) by the judicious positioning of conducting parts 302, 304 to have a desired separation, or by some other technique. The cutting width defined in claims 3 and 29 arises from machining the metal foil of the component blank, which comprises a metal foil bonded to an insulating substrate, so it is not created by moving adjacent conducting parts to a desired separation. There is accordingly no parallel between the disclosure of Hailey and the technique defined in claims 3 and 29, such that – by routine skill – the disclosure of Hailey could be modified to arrive at the present invention as claimed.

Regarding dependent claims 10, 11, and 43, the Examiner contends that Hailey discloses all of the claimed limitations except producing slots of approximately 150 μm at 1.5 mm intervals. The slots of these claims are introduced in dependent claims 9 and 42, and are formed in the back of the component blank – hence the insulating substrate – to be equal in depth to the combined thickness of the foil and substrate. As described at page 10, lines 9 to 12 of the application as filed, the back slots can be used for filling the trenches with filling material without contaminating the ultimate sensing surface. There is simply no disclosure in Hailey of any analogue of such back slots, whether of 150 μm length at 1.5 mm intervals or otherwise. Accordingly, no amount of routine experimentation of the device as disclosed by Hailey could lead to the configuration defined in claims 10, 11 and 43.

The Examiner makes the particular observation that "producing slots and the length of the interval is equivalent to the metallic conducting part" of Hailey. However,

the metallic conducting parts 302, 304 of Hailey are separated by a split (i.e. a moat 306) that is shown only as separating (as the Examiner implicitly acknowledges) the metallic conducting parts. There is no disclosure in Hailey that moat 306 also separates a substrate on which the metallic conducting parts 302, 304 might be mounted. Thus, moat 306 is not analogous in any sense to the back slots defined in claims 10, 11 and 43.

The Examiner also rejects dependent claims 5 and 31 under 35 U.S.C. 103(a) as being unpatentable over Hailey in view of Hirose.

Regarding claims 5 and 31, the Examiner contends that Hirose discloses an insulating material made of polymer. The Examiner is presumably alluding to resin filler 40 of, for example, Figure 1 of Hirose. However, it is submitted that at least owing to the dependence of these claims on – respectively – independent claims 1 and 27, claims 5 and 31 are inventive over the cited combination of arts.

The Examiner rejects claims 18 to 21, 35, 36, 40 and 41 under 35 U.S.C. 103(a) as being unpatentable over Hailey in view of Chen (US 2005/0116718).

Regarding dependent claims 18 and 40, the Examiner contends that Chen teaches an insulating material comprising a plurality of layers of fiberglass prepeg, and directs the applicant to paragraph 7 of Chen.

However, the cited passage merely describes the use of laminated fiberglass material impregnated with epoxy resin as a housing for enclosing antennas of EM logging instruments. Enclosure, by fiberglass or otherwise, teaches against the features of claims 18 and 40. These claims define that the insulating substrate "comprises a plurality of layers of fiberglass prepeg", but the insulating substrate (and hence the

fiberglass prepeg) is bonded to a thin metal foil in a manner that gives the resulting component blank a metal face that comprises a surface of said metal foil (see claim 1). Chen teaches enclosing the recited antennas, apparently for protection from damage or interference, hence leaving no metal face.

Thus, the combination of Hailey and Chen would encourage the skilled person to enclose (not merely back) the devices disclosed by Hailey with laminated fiberglass, contrary to the configuration defined in claims 18 and 40 of the present application.

Regarding dependent claims 19, 20 and 41, the Examiner contends that Hailey as modified by Chen discloses an electrical component in the form of a foil sensor and the coating of the component blank on the surface comprising the ultimate sensor with a chemically resistant coating solution to protect that surface from contamination during sensor processing. The Examiner again refers to paragraph 7 of Chen.

However, paragraph 7 of Chen describes supplying a permanent protective coating made from tough plastic or fiberglass, whereas the embodiments of claims 19, 20, and 41 – as the Examiner has appreciated – applies a chemical resistant coating solution "to protect said surface from contamination during sensor processing" [emphasis added], but the coating is subsequently removed. Chen makes no reference to how his sensors (i.e., the antennas of EM logging instruments) are handled during processing. Accordingly, the cited combination of Hailey and Chen in no way suggests the present invention as defined in claims 19, 20 and 41.

Regarding dependent claims 21 and 35, the Examiner contends that Hailey as modified by Chen further discloses an electrical component that comprises two or more different types of foil sensors, again identified in paragraph 7 of Chen. However, the

cited passage of Chen makes no reference to a method involving forming a blank (by laser machining) to form two different types of sensors. It is even unclear whether this passage refers to "two different types of sensors", but there is certainly no disclosure in paragraph 7 of Chen of laser machining a sensor blank to form two different types of sensors.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.

Respectfully submitted,

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